

This enduring national asset integrates science and technology for manufacturing success that meets our customer's special manufacturability challenges.

Since its establishment in 1997, more than 5,000 industries and government agencies have capitalized on the resources of the National Prototype Center (NPC). These customers received subject-matter expertise as well as critical manufacturing resources enabling development of innovative manufacturing solutions.



The National Prototype Center taps into Y-12's hundreds of specialists as well as equipment such as this Henri Liné 5-axis gantry mill, which can machine and fabricate parts weighing as much as 120,000 pounds.

Specializing in high-risk, complex prototype work, the NPC integrates manufacturing, engineering and science to build first-of-a-kind products. It also modifies or enhances existing products and develops new, innovative manufacturing processes to solve the toughest manufacturing problems.

The NPC offers a broad spectrum of advanced manufacturing facilities, equipment and services, including:

- Unique multi-axis and high-speed machining
- Coordinate-measuring machines that are among the most accurate in the world
- Machining of ferrous, nonferrous, ceramic, cermet, graphite and hazardous materials
- A highly secure, classified environment suitable for the most sensitive programs (e.g., S/TS/SCI, etc.)
- ORMC Accredited by NIST in 14 disciplines

Using Y-12's 60 years of prototyping experience, the NPC has been the sole source of solutions for unique manufacturing challenges such as:

- Advanced Amphibious Assault Vehicle (AAAV) – delivered prototype hulls and turrets

- Advanced Surgical Suite for Trauma Care – developed a highly mobile 400-ft² surgical suite that deploys in minutes and protects against small-arms fire, biological and chemical contamination and extreme temperature (U.S. Army, USMC)
- U.S. Navy *Seawolf* Propulsor – developed a full-scale prototype propulsor for the *Seawolf* submarine ahead of schedule and \$5 million under budget
- Depleted-uranium machining
- 5'-diameter isostatic pressing
- M1A2 Abrams battle tank (U.S. Army)
- Crusader attack system (United Defense, General Dynamics, U.S. Army)
- X-33 suborbital spaceplane (Lockheed Martin Skunk Works®/NASA)
- Joint Strike Fighter (Lockheed Martin Skunk Works®/DoD)
- F-22 Raptor fighter aircraft (Lockheed Martin Skunk Works®/USAF)
- C-130J "Super" Hercules military aircraft (Lockheed Martin Skunk Works®/USAF)
- Interplanetary material containers
- Nuclear shipping packages

- Specialized tooling
- Glove boxes

EXPERTISE

- Prototypes ranging from subnanometer to decameter scale
- Advanced machine simulation
- Surface finishes to angstrom tolerances
- Fabrication tolerances to 50 millionths of an inch
- Advanced materials development and manufacture
- Engineering design, testing, licensing and production management

TOOLS AND RESOURCES

- 400 machine tools
- 250 computer-controlled and 3-, 5-, and 8-axis milling tools
- 18 coordinate measurement machines
- 10 equipment suites for skills enhancement
- CAD/CIM

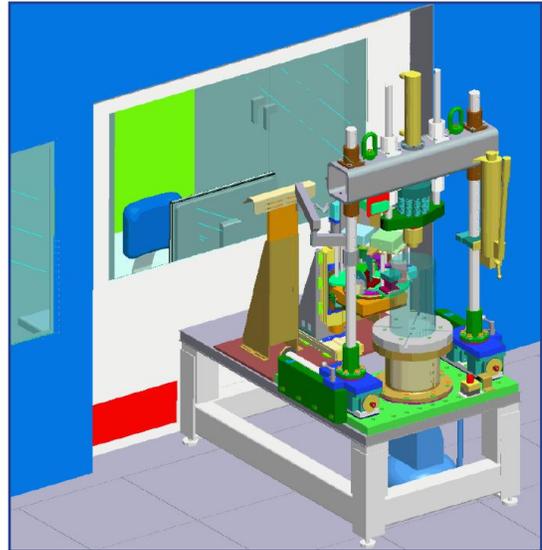
In addition to these resources, the NPC partners with universities, other government agencies and industry to provide a full range of unique, specialized prototyping services.

BRINGING CONCEPTUAL DESIGNS TO LIFE

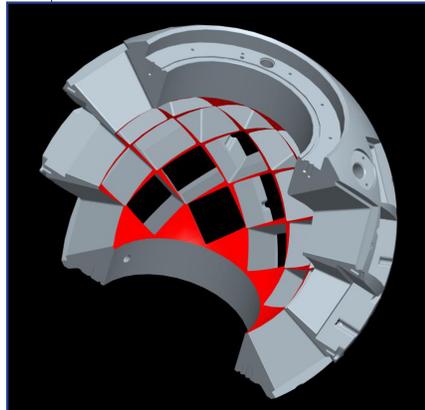
The NPC has the capability to quickly and inexpensively print color 3-D models from designs, allowing flaws to be identified at an early stage. Using the rapid prototype printer to create a model for early evaluation is faster and less costly than full-fledged fabrication. NPC's 3-D scanner creates as-built drawings from objects that can be used for analysis and testing.



3-D Scan of deformed ES-4100 Containment Vessel after regulatory testing.



Pro/E design of an electron beam weld inspection machine—used for prototyping, simulation technologies and advanced computational methods, including graphical modeling, process modeling, finite element analysis and human factor modeling.



Y-12 assessed the manufacturability of this unique component of the Spallation Neutron Source at Oak Ridge National Laboratory and used modeling and rapid prototyping to effect a new design suitable for manufacturing using conventional methods and commercial machine shops, saving our customer about \$250,000.

For more information, call us toll-free:

855-Y12-NNSA [855-912-6672]

Visit us on the web at www.y12.doe.gov